Supplementary material for the article:

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Study of heavy metals biosorption on native and alkali-treated apricot shells and its application in wastewater treatment

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Supplementary material

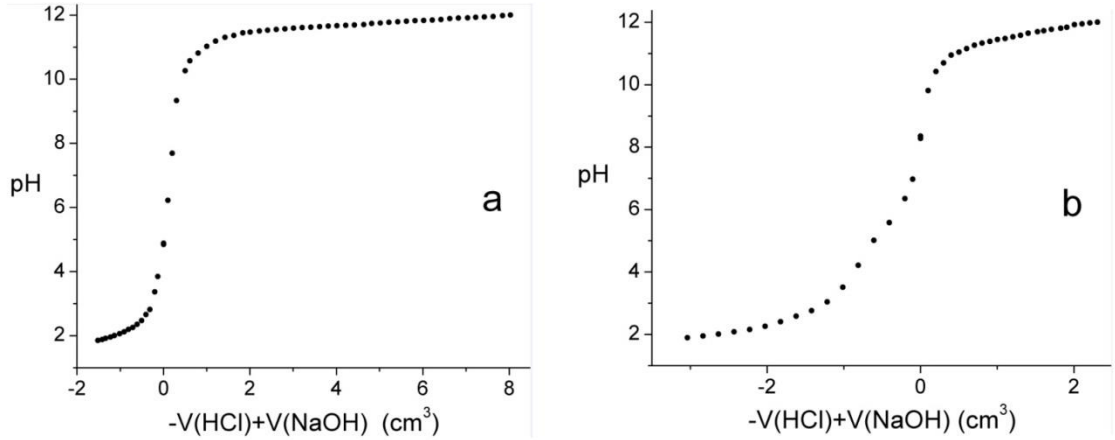

Fig. 1 The titration curves of mixtures of 1.5 g of SH (a) or SHM (b) and 30.0 cm^3 of water titrated with 0.3 M HCl and NaOH solutions. The volumes of HCl and NaOH were recalculated on exactly 0.3000 M instead of actually used (0.3038 M HCl and 0.3010 M NaOH).

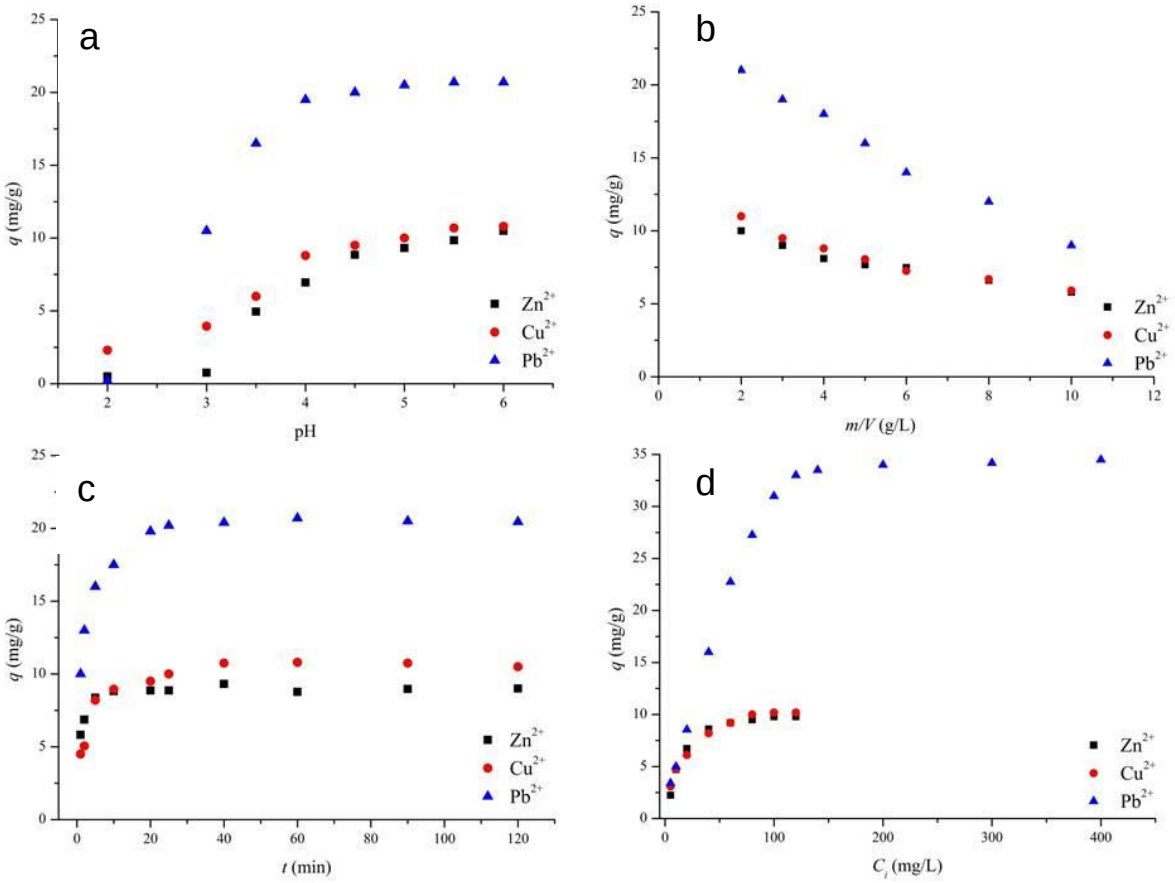

Fig. 2 Effect of operating parameters on adsorption capacity of SHM: (a) pH; (b) SHM dosage; (c) contact time and (d) initial metal concentration

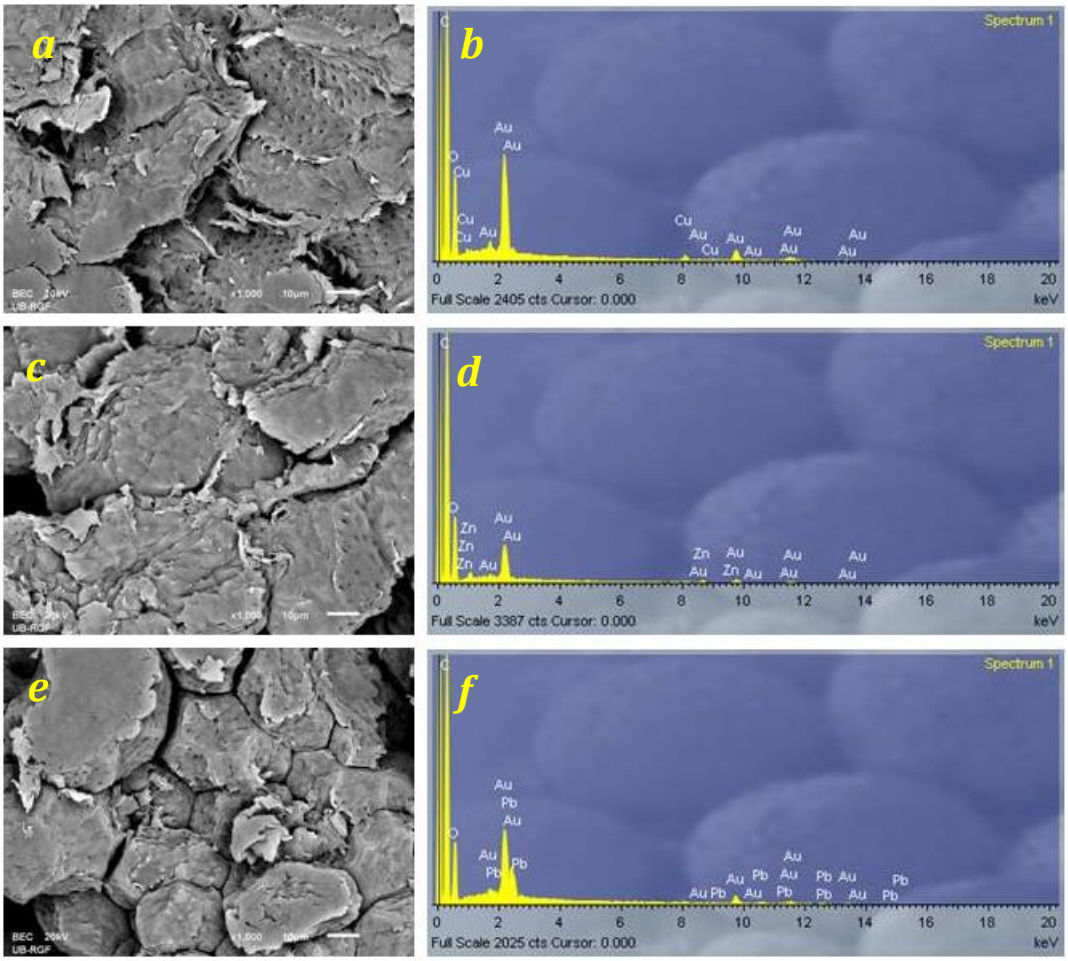

Fig. 3 SEM micrographs of SHM: a) after Cu(II) adsorption (1000x); c) after Zn(II) adsorption (1000x); e) after Pb(II) adsorption (1000x); EDX spectrum of SHM: b) after Cu(II) adsorption; d) after Zn(II) adsorption; f) after Pb(II) adsorption.

Table 1 Elemental distribution of SH, SHM and SHM after metal adsorption

Biomass / Element (wt.%)	C	N	O	Na	Mg	K	Ca	Cu	Zn	Pb
SH	59.65	0.00	40.11	0.00	0.00	0.24	0.00	-	-	-
SHM	59.29	0.00	40.29	0.42	0.00	0.00	0.00	-	-	-
SHM-Cu	57.93	0.00	39.88	0.00	0.00	0.00	0.00	2.20	-	-
SHM-Zn	53.06	0.00	44.10	0.00	0.00	0.00	0.00	-	2.79	-
SHM-Pb	57.96	0.00	36.00	0.00	0.00	0.00	0.00	-	-	6.03

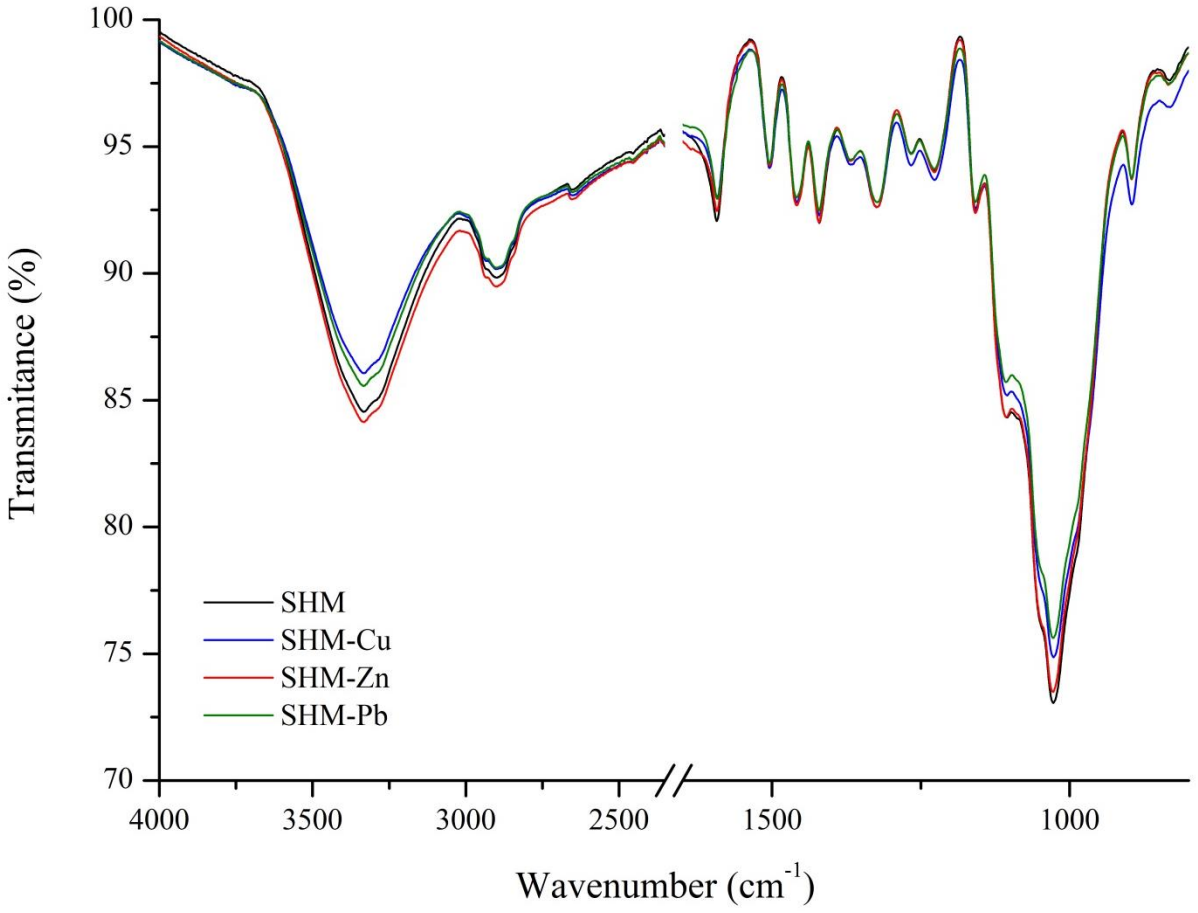

Fig. 4 FTIR-ATR spectra of SHM before and after adsorption of metals